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Assessing the Feasibility of Epidemiologic Research on Migrant and Seasonal Farmworkers: An Overview

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This issue of *American Journal of Industrial Medicine* contains fifteen reports on a series of pilot projects designed to assess the feasibility of conducting epidemiologic research on migrant and seasonal farmworkers. This work was begun after our 1993 review [Zahm and Blair, 1993] found that, despite concerns about farmworkers' exposure to mutagenic and potentially carcinogenic pesticides, there were few descriptive data or etiologic investigations on cancer among farmworkers. The few studies that evaluated cancer among farmworkers suggested that, like farm owner/operators, they were at increased risk for cancers of the stomach, prostate, testis, and multiple myeloma. They also appeared to be at excess risk of cancers of the buccal cavity and pharynx, lung, liver, and cervix. We thought the paucity of research on this population may have been due to perceived concerns about the methodologic difficulties of conducting epidemiologic studies in a population that is highly mobile, has little education, often does not speak English, and has lengthy, complex job histories. With funding from the National Cancer Institute and the Migrant Health Program of the Bureau of Primary Health Care, Health Resources and Services Administration, the Farmworker Epidemiology Research Group was formed to assemble information regarding methodologic issues thought to hinder epidemiologic research on farmworkers [Zahm et al., 1997a]. The Group, made up of investigators and migrant health care workers from approximately 20 institutions, conducted projects that addressed questionnaire design, ascertainment of pesticide exposures, tracing, evaluating cancer incidence and mortality, and establishing a cohort of farmworkers for future follow-up. The generous and collaborative nature of the Group made this a successful and enjoyable experience, which provided important information that can be used by others interested in the area.

Questionnaires are the primary method by which epidemiologists collect information to assess relationships between potential risk factors and disease. Because farmworkers typically change jobs and work with several crops and tasks in multiple geographic areas each year, there was concern that traditional interviewing techniques might be ineffective. In this volume, we describe the development and pretesting of a questionnaire that collected lifetime occupational histories via a life events/icon calendar [Zahm et al., 2001]. This method uses a visual approach to reconstruct the subject's work history by applying icons (pictures of sticky labels) to a calendar to represent the subject's important life events, crops, and work activities. This approach proved extremely effective as evidenced by the greater number of jobs reported and more work time accounted for than when using traditional interview methods to obtain occupational histories [Engel et al., 2001b]. The reliability of the life events/icon calendar questionnaire was demonstrated by interviewing a group of farmworkers twice, 8–14 months apart [Engel et al., 2001a] and by comparing occupational histories self-reported by farmworkers with those reported by their spouses [Colt et al., 2001a].

Although farmworkers are often exposed to pesticides through their work with crops and livestock, they are usually unable to identify specific products because the pesticides have usually been applied by the farm owner/operator or other agricultural workers (e.g., commercial pesticide applicators). Ascertaining pesticide exposures, therefore, is a challenging, but critical, element for informative epidemiologic research. The typical approaches for assessing exposures in studies of farm owner/operators or in other industries cannot be used in studies of farmworkers [Stewart et al., 2001]. Ward et al. [2001], however, demonstrated the feasibility of identifying farmworkers'

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probable pesticide exposures by linking the information on crops, tasks, month, year, and location worked to survey data and monitoring studies on pesticides used for crops and livestocks in the seven states in which we pilot tested the life events/icon calendar questionnaire. Hernandez-Valero et al. [2001] evaluated serum levels of pesticides and pesticide metabolites in relation to questionnaire data on work histories, work practices (e.g., work clothing, protective attire), personal hygiene, and other variables. These results suggest that some questionnaire data may be reasonable indicators of exposure when biomarker data are not appropriate or available.

Farmworker children are often exposed to hazardous substances at early ages. Since their susceptibility might be great, we included methods to assess their exposures and risks in our research activities. Cooper et al. [2001c] conducted focus groups in Texas and Colorado to identify the best questionnaire methods for ascertaining potential pesticide exposure among children of migrant farmworkers. Mills and Zahm [2001] measured levels of pesticide metabolites in the urine of adult farmworkers and their children, finding higher levels of several metabolites among the children than among the adults, although interpretation of the results are limited by the small sample size. In another small project, Cooper et al. [2001b] enrolled pregnant farmworker women to assess the potential for in utero exposure to pesticides, their metabolites, and other compounds by measuring their levels in maternal urine, umbilical cord blood, and placental tissue at the time of delivery. The study demonstrated the difficulties in assessing exposure for compounds that are quickly metabolized and eliminated from the body [Cooper et al., 2001b].

Tracing is critical to the success of most epidemiologic study designs, whether locating specific individuals for interview in a case-control study or following to determine vital status years after initial entry in a cohort study. Tracing has been a major concern regarding studies of migrant farmworkers because, by definition, they leave their permanent home for extended periods of time as they travel to find work. We evaluated the ability to trace farmworkers over time in two projects [Cooper et al., 2001a; Nordstrom et al., 2001]. Cooper et al. [2001a] selected a sample of farmworkers who had participated in a health study in Texas, their home state of permanent residence, during 1984–1987 and attempted to locate them 10 years later. An excellent follow-up rate of 91% was achieved. This was probably a reflection of the high participation rates among persons contacted for information, stability of the farmworkers' permanent homes, predictable timing of migration, and a longstanding health research program with established community contacts. Less successful, but still informative, was an attempt to trace farmworkers 10 years after initial identification by a health clinic in Wisconsin [Nordstrom et al., 2001].

The risk of cancer among migrant farmworkers was assessed in a cohort study of members of the United Farmworkers of America [Mills and Kwong, 2001] and a proportionate mortality study in 24 US states [Colt et al., 2001b]. Comparing the farmworker results with the disease patterns typically experienced by farm owners/operators showed some similarities and some differences. For example, the excess stomach cancer observed among the farmworkers in the United Farmworkers of America [Mills and Kwong, 2001] and in the 24-states dataset [Colt et al., 2001b] is consistent with similar excesses frequently reported among farmers [Zahm et al., 1997b]. In contrast, prostate cancer was not elevated among the farmworkers in these two reports [Mills and Kwong, 2001; Colt et al., 2001b], but is frequently increased among farmers [Zahm et al., 1997b].

The last paper in this volume describes preliminary results of an effort to establish a cohort of farmworkers for future epidemiologic research [Mull et al., 2001]. The Association of Farmworker Opportunity Programs has received funding from the US Department of Labor to create the National Farmworker Database for their member agencies, which provide farmworkers with services such as job placement, language training, and emergency travel and food funds. Through the National Farmworker Database, member agencies can efficiently access data already in the Database when farmworkers apply for services at multiple agencies as the farmworkers move around the country. The Database contains identifiers and demographic information on the farmworkers and their family members as well as some occupational history data for the 2 years prior to the application. In the current project, we added collection of smoking history, family history of cancer, and some summary lifetime occupational information, which enhanced the Database's utility for cancer epidemiologic research.

This volume does not answer every concern on conducting research on farmworker health, but we believe that these projects demonstrate the feasibility of conducting case-control or cohort studies in the United States on the pressing health problems facing farmworkers. Although cancer epidemiology was the main focus in these projects, many of the lessons learned and the materials developed are relevant for epidemiologic research on other health outcomes. We hope this work will stimulate and encourage other investigators to conduct research that will lead to improvements in the health of this important, but underserved, population.

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